BRUSHWELLMAN
ENGINEERED MATERIALS

Brush Wellman Inc.
Elmore, Ohio 43416
Phone 419/862-2745

#16

March 3, 1989

Mr. Walter Hartford
Raytheon Inc.
190 Willow Street
Waltham, Mass 02154

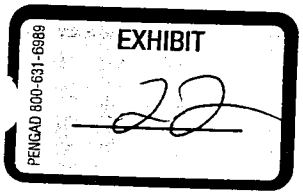
Dear Mr. Hartford:

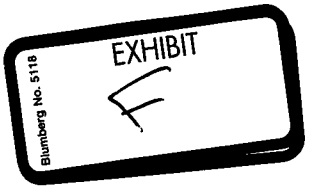
The following is a summary of the requested industrial hygiene information regarding the machining of metallic beryllium parts. The machining of beryllium parts has the potential to generate airborne beryllium above the occupational standard. The operation can be best controlled by providing local exhaust ventilation at the point of operation to capture and control any airborne particulate. The machining of beryllium under a liquid lubricant/coolant can generate an elevated airborne concentration. In addition, please note the recycling of liquid coolant containing finely divided beryllium in suspension can result in the concentration building to a point where the particulate becomes airborne during use. A filter, centrifuge, or settling chamber can be installed in-line if this becomes a problem.

The simple hand assembly of metallic beryllium parts does not pose any inhalation or dermatitis hazard. However, we do not recommend handling metallic beryllium with bare hands because skin oil can stain the metal.

Inhalation of concentrations of beryllium in excess of the Occupational Standard described below can cause serious lung disorders. The Occupational Safety and Health Administration (OSHA) of the U. S. Department of Labor has established mandatory standards for occupational exposures as set forth in 29 CFR Section 1910.1000, Table Z-2. In summary, this regulation provides that:

1. Daily weighted average exposure over an eight-hour day may not exceed 2.0 micrograms beryllium per cubic meter of air.





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2. Short term exposures above 5.0 micrograms beryllium per cubic meter of air but not greater than 25.0 micrograms beryllium per cubic meter of air is permissible for a total of no more than 30 minutes during an eight-hour working period.

The preferred method of achieving this standard is by local exhaust ventilation. Air samples should be taken of all operations where beryllium exposures exist to make certain the worker's exposure is within permissible concentrations established by OSHA.

The Environmental Protection Agency (EPA) published an emission standard for beryllium in the Federal Register on Friday, April 6, 1973, setting the maximum permissible level to be emitted during a 24-hour period at 10 grams beryllium. Process ventilation exhaust air should be directed through a filtering device to the outdoors at a point where it will not be recirculated back to the work area. HEPA type absolute filters are available for controlling exhaust emissions when this standard will be exceeded; the Cambridge Filter Corporation, Syracuse, New York, makes such a filter.

Approved respiratory protective devices should be used for protection against airborne beryllium. Filters approved by NIOSH against, dust, fumes, and mist having a time weighted average less than 0.05 milligrams per cubic meter are the permissible type. The Willson 1200 respirator with a R-12 filter is of this type.

Separate lockers for street clothes and work clothes should be provided. A dirty room/clean room concept should be maintained. Employees should be instructed not to throw soiled clothing as this action can cause elevated concentrations of airborne beryllium.

If you utilize an outside laundry service, I recommend you take the following precautions.

1. Inform the launderer in writing of the associated health hazards of beryllium dust and emphasize the hazard should be explained to their employees.

2. The persons who handle the soiled clothing must wear a high efficiency respirator as previously described. All employees should be trained in respiratory protection and fit tested with the proper size of respirator.

3. All clothing shipped to the launderer should be in strong plastic bags and labeled with a tag which reads:

DANGER

BERYLLIUM CONTAMINATED CLOTHING

4. The laundering of soiled clothing requires the use of a high efficiency respirator to handle bulk clothing up to and including the loading of the wash machines. No respirator is required for handling after that time.

5. Plastic laundry bags should not be reused. All used bags should be placed in a plastic bag and can be discarded with normal trash.

Beryllium scrap is normally recycled. In cases where this is not justified, solid material can be landfilled. Metallic beryllium dust has been listed by the Environmental Protection Agency as a hazardous waste under the authority of the Resource Conservation and Recovery Act and should only be disposed at an approved site.

Enclosed is a booklet entitled "Health Effects of Beryllium and Its Components", the article entitled "High Velocity-Low Volume Ventilation Systems" which gives further information on the industrial hygiene aspects of controlling beryllium, and a booklet entitled "Health and Safety Concerns of Machining Beryllium Metal". Also enclosed is a material safety data sheet M-1.

We have an audiovisual training tape on metallic beryllium products which can help you meet your OSHA Hazard Communication training obligation. Contact your Sales Representative to obtain a copy.

If I can be of further assistance, please do not hesitate to call me at (419) 862-4212.

Sincerely,

Marc E. Kolanz, Manager
Environmental Control Dept.

enclosures